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A NEW FOSSIL CROCODILIAN FROM THE PALEOCENE OF NEW MEXICO

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In the collections made by the American Museum Expedition conducted by Granger, Sinclair and Olsen in 1913 is a fairly well preserved skull of a hitherto unknown crocodilian. It is the purpose of this article to announce and to describe this material.

NAVAJOSUCHUS, NEW GENUS

TYPE SPECIES.—*Navajosuchus novomexicanus*, new species.

GENERIC CHARACTERS.—Lacrimal bones extending forward considerably beyond prefrontal bones but not having contacts with the nasals as in the genus *Crocodylus*. Each maxillary bone has a sharp process that separates the lacrimal from the nasal and partially separates the prefrontal from the nasal. Posterior ends of the two nasals together rather blunt. The nasal bones are broad, occupying an unusually large portion of the total breadth of the snout. The nasals extend forward an unusual distance into the narial aperture. Snout high in the vertical dimension with a U-shaped depression anterior to the interorbital plate as in *Caiman*.

Navajosuchus novomexicanus, new species

TYPE.—Skull, Amer. Mus. No. 5186. Collected by Sinclair and Olsen in 1913.

TYPE LOCALITY AND LEVEL.—Head of West Fork of Kimbetoh Wash, New Mexico; Torrejon Formation, Paleocene.

SPECIFIC CHARACTERS.—Lack of pronounced constriction of premaxillaries, large mandibular tooth, probably the fourth, biting into pit instead of notch, large size of external narial aperture, small size of supratemporal fenestrae, broad palatine bar between palatine fenestrae.

GENERAL FORM OF SKULL

The skull is of moderate size and does not exhibit juvenile characters. The snout is comparatively short and the cranial region is comparatively long in proportion to the breadth. The snout is also relatively high.

The cranial table is not well preserved, but it was evidently rather high. There is a superficial excavation in the frontal region, somewhat resembling that of the modern caimans, where the interorbital plate leads to the snout. The bone at the outer ends of the broadly U-shaped ridge behind the excavation is thickened and slightly elevated. There is practically no lateral indentation of the snout and no notch, so far as preservation admits of determination, at the posterior ends of the premaxillaries to receive mandibular teeth. In this character the skull resembles that of *Alligator*. The anterior end of the snout is not so broad as that of *Alligator*. The degree of vertical festooning of the upper jaws is slight. The pitting is rather fine textured on the anterior part of the skull, and that on the posterior part is rather coarse.

THE CAVITIES OF THE SKULL

The *external narial aperture* is large. Its breadth is proportionally much greater than its length. Its anterior border is not completely preserved, but enough of it is present to indicate that the opening faced forward, to some extent, as in *Allognathosuchus* and in some of the teleosaurs, rather than wholly upward, as in *Alligator*. The anterior tips of the nasals form a prominent blunt projection into the aperture. This occupies a considerable portion of the posterior border of the aperture, in fact a relatively greater portion than in most crocodilians. It cannot be determined positively whether or not a bar extended forward from this process, dividing the aperture as in *Alligator*, but it is most likely that such a bar did not exist.

Only the inner and anterior borders of the *orbits* are preserved, with slight suggestions of the antero-external borders. These indicate that the orbits themselves were large and that they were directed outward somewhat more than in most crocodilians. The interorbital plates are broad.

The borders of the *supratemporal fenestrae* are incomplete, but the sections preserved indicate that they were small and were either circular or were slightly broader than long. The interfenestral plate is moderately broad, and the postero-internal borders of the fenestrae were uprolled.

On the palate borders of the *premaxillary foramen* are preserved well enough to indicate that this aperture was of moderate size and

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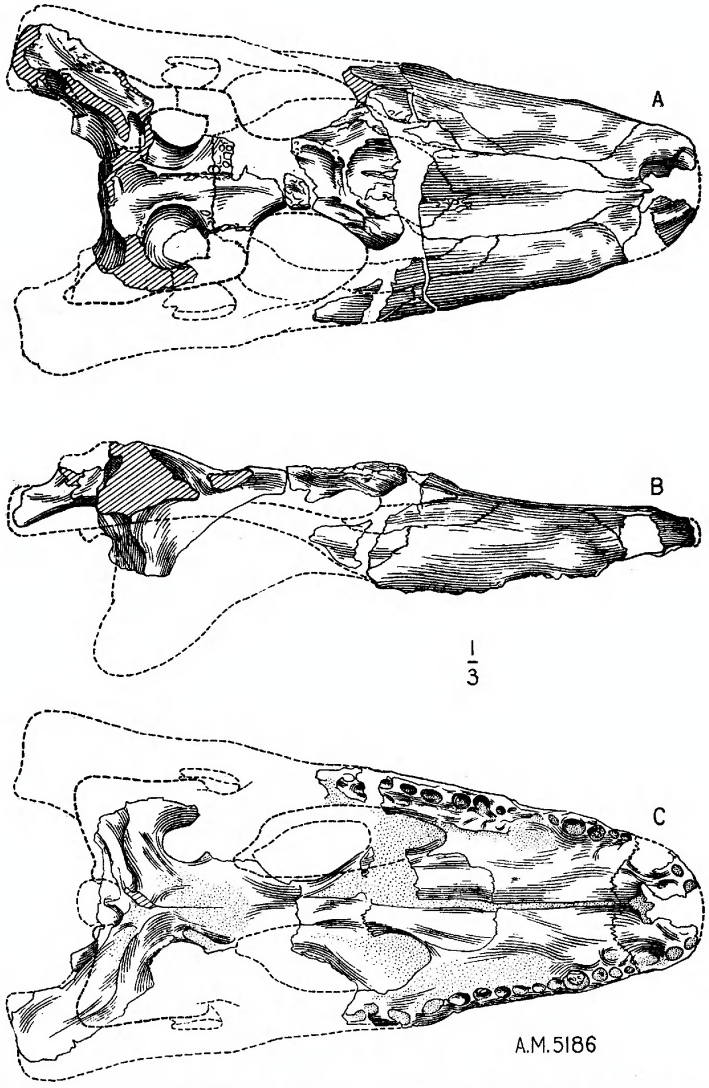

Fig. 1. *Navajosuchus novomexicanus*, new species. Type, skull, Amer. Mus. No. 5186. One-third natural size. Drawing indicates the nature of the type material as preserved. A, superior view; B, lateral view, right side; C, inferior view.

Note.—The sutures separating the lacrimals from the maxillaries and from the nasals are incorrectly represented in Fig. 1A. See the text.

elongate-pear shaped, with the greatest breadth near the posterior end. Its posterior end lies opposite the second mandibular teeth.

Only the anterior portions of the *palatine fenestrae* are preserved. These openings are pointed anteriorly, the points being nearer to the mid-line than to the external borders of the skull. They extend forward to the level of the eleventh maxillary teeth. The interfenestral area is relatively broad.

The region of the *internal narial aperture* is not preserved. The *foramen magnum* is broad and is shallow vertically.

The Bones of the Skull

The *premaxillary bones* are distinctive in shape. On the snout they are broad and short. The anterior plates in front of the external narial aperture are incomplete, but it is evident that they were low. The lateral plates, between the apertures and the lateral borders of the snout, are thick and broad. The posterior processes, wedging backward between the maxillaries and the nasals, are unusually small. They are extremely slender at their posterior tips but are broad just behind the narial aperture, and they extend backward only for the space occupied by the first three or four small maxillary teeth. The characters of the premaxillaries are rather obscure on the palate, but the premaxillary dental border is clearly very short. The teeth are not preserved, and the alveoli are not clear, but evidently there were five extremely small teeth in each premaxillary. The premaxillo-maxillary suture appears on the palatal surface immediately posterior to the alveolus of the last of these teeth, then passes through the pit which lodged a large mandibular tooth, then somewhat irregularly inward and backward to a point near the mid-line and then symmetrically to the opposite side. At no point does the suture extend back beyond the level of the third maxillary teeth.

The *maxillaries* are comparatively short and broad and are rather *high* in the vertical direction. Their sutures with the nasals are short. Their sutures with the lacrimals are distinctive; beginning at the point where lacrimals, prefrontals and maxillaries join, they extend forward and outward a short distance, perhaps one centimeter, then extend outward, downward and backward irregularly to the junction with the jugals. The lacrimals are therefore excluded from contact with the nasals, but by an extension of the maxillaries and not the prefrontals as in *Alligator*. There are very short sutures with the prefrontals. The sutures with the jugals are not distinctive.

The number of teeth in each maxillary is not certain. The left maxillary contains twelve well defined alveoli, and several more are imperfectly outlined. The right maxillary appears to have had fifteen alveoli, although the exact number is not certain. The teeth themselves are largely missing. The first maxillary tooth of the left side is extremely small and is much longer fore and aft than it is thick. It is broken, so its vertical height cannot be made out.

The alveoli increase steadily from the first to the fifth. The fifth is not large, however, in proportion to the breadth of the skull. The sixth, seventh and eighth alveoli are small. Posterior to the eighth all of the alveoli are of moderate size and appear to be approximately equal in size. All of the alveoli preserved have complete borders, there being no common alveolar groove for several teeth unless it is behind the twelfth.

The maxillaries are short along the mid-line of the palate.

The *prefrontals* are acuminate both anteriorly and posteriorly. Their preservation is imperfect, but insofar as their boundaries can be determined these boundaries are somewhat unique. The prefrontals appear to have relatively short contacts with the nasals. They also appear to have short contacts with the maxillaries. They do not extend forward beyond the lacrimals, as in *Alligator*, but have contact with small posterior processes of the maxillaries that separate the nasals from the lacrimals, and to some extent from the prefrontals. The prefrontals are thickened at the outer ends of the U-shaped ridge in front of the interorbital plate, and they participate in the ridge itself, and each of them includes an inconspicuous fore and aft ridge behind the main ridge.

The *lacrimals* are incompletely preserved. They appear to be relatively large. They extend farther forward than the prefrontals. They are separated from the nasals by the small posterior processes of the maxillaries noted above.

The *frontal* is characteristic. It was apparently excluded from the borders of the supratemporal fenestrae. The interfenestral plate is unusually broad for a skull the size of the one under consideration. The central portion of the U-shaped ridge is at the base of the anterior process. This process is small; it extends forward only to about the anterior ends of the orbits.

The *parietal* is not well preserved. The interfenestral plate is comparatively broad, and the edges are uprolled.

The *supraoccipital*, the *exoccipitals*, the *basioccipital*, the *basisphenoid*, the *pterygoid*, the *quadrates*, the *quadrato-jugals* and the *jugals* are either lacking or are not sufficiently well preserved to warrant description.

Measurements in mm.

Length, tip of snout to supraoccipital	230 est.
Length of snout	131 est.
Breadth of snout at base	98
Breadth of snout across fifth maxillary teeth	69
Breadth across notch	53
Breadth across interorbital plate	28
Breadth across interfenestral plate	14
Breadth of right supratemporal fenestra	24 est.

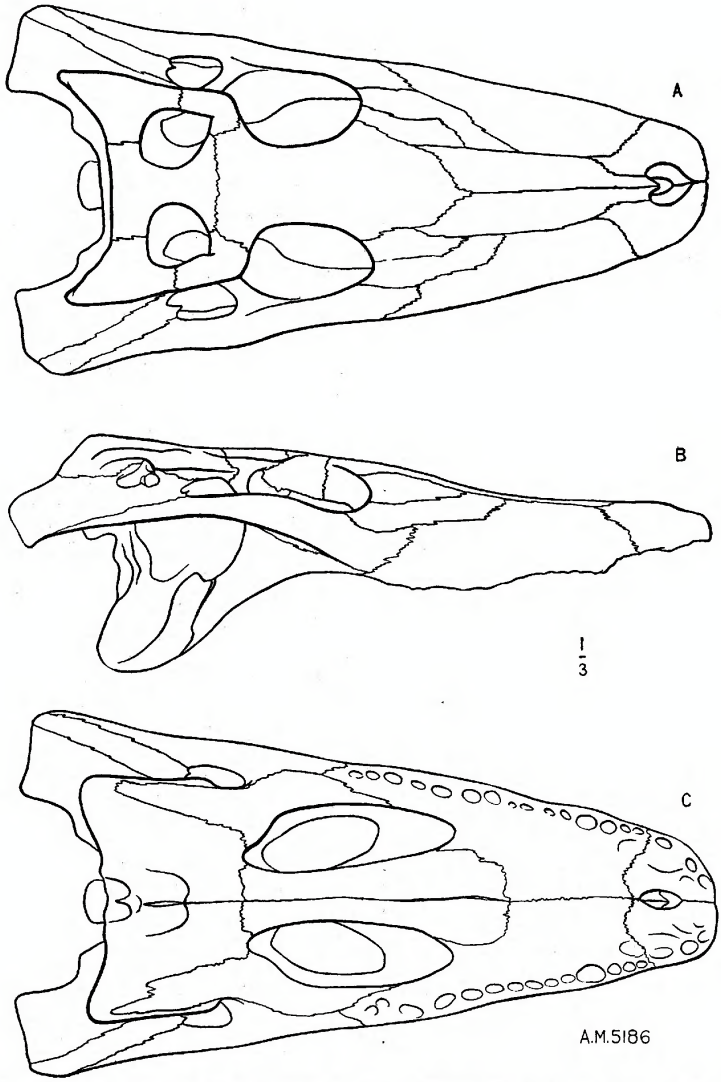

Fig. 2. *Navajosuchus novomexicanus*, new species. Type, skull, Amer. Mus. No. 5186. One-third natural size. Drawing indicates outline and sutures as restored. A, superior view; B, lateral view, right side; C, inferior view.

Note.—The sutures separating the lacrimals from the maxillaries and from the nasals are incorrectly represented in Fig. 2A. See the text.